

03/02/98

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UTILITY PATENT APPLICATION TRANSMITTAL

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ADDRESS TO:

Assistant Commissioner for Patents
Box Patent Application
Washington, D.C. 20231

Attorney Docket No. 83707
First Named Inventor Gus Alexander
Express Mail No. TB 059 847 238 US
Total Pages 16

APPLICATION ELEMENTS

1. ☒ Transmittal Form with Fee
2. ☒ Specification (including claims and abstract) [Total Pages 14]
3. ☒ Drawings [Total Sheets 2]
4. ☐ Combined Declaration and Power of Attorney [Total Pages 3]
 - a. ☐ Unexecuted
 - b. ☐ Copy from prior application [Note Box 5 below]
 - i. ☐ Deletion of Inventor(s) Signed statement attached deleting inventor(s) named in the prior application
5. ☐ Incorporation by Reference: The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6. ☐ Microfiche Computer Program
7. ☐ Nucleotide and/or Amino Acid Sequence Submission
 - a. ☐ Computer Readable Copy
 - b. ☐ Paper Copy
 - c. ☐ Statement verifying above copies

ACCOMPANYING APPLICATION PARTS

8. ☐ Assignment Papers
9. ☐ Power of Attorney
10. ☐ English Translation Document (if applicable)
11. ☐ Information Disclosure Statement (IDS)
 - ☐ PTO-1449 Form
 - ☐ Copies of IDS Citations
12. ☐ Preliminary Amendment
13. ☒ Return Receipt Postcard (Should be specifically itemized)
14. ☐ Small Entity Statement(s)
 - ☐ Enclosed
 - ☐ Statement filed in prior application; status still proper and desired
15. ☐ Certified Copy of Priority Document(s)
16. ☐ Other:

17. If a CONTINUING APPLICATION, check appropriate box and supply the requisite information:
☐ Continuation ☐ Divisional ☐ Continuation-in-part of prior application Serial No.

APPLICATION FEES

BASIC FEE				\$790.00
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total Claims	20 -20=	0	x \$22.00	\$0
Independent Claims	2 - 3=	0	x \$ 82.00	\$0
<input type="checkbox"/> Multiple Dependent Claims if applicable			+ \$270.00	\$0
Total of above calculations =				\$0
Reduction by 50% for filing by small entity =				\$(395.00)
<input type="checkbox"/> Assignment fee if applicable			+ \$40.00	\$0
TOTAL =				\$395.00

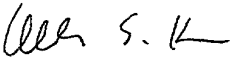
UTILITY PATENT APPLICATION TRANSMITTAL

Attorney Docket No. 83707

18. ☒ Please charge my Deposit Account No. 12-1216 in the amount of \$395.00.
19. ☐ A check in the amount of \$ is enclosed.
20. The Commissioner is hereby authorized to credit overpayments or charge any additional fees of the following types to Deposit Account No. 12-1216:
- a. ☐ Fees required under 37 CFR 1.16,
- b. ☒ Fees required under 37 CFR 1.17.
- c. ☐ Fees required under 37 CFR 1.18.
21. ☒ The Commissioner is hereby generally authorized under 37 CFR 1.136(a)(3) to treat any future reply in this or any related application filed pursuant to 37 CFR 1.53 requiring an extension of time as incorporating a request therefor, and the Commissioner is hereby specifically authorized to charge Deposit Account No. 12-1216 for any fee that may be due in connection with such a request for an extension of time.

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Date	March 2, 1998

UTILITY (Rev. 11/18/97)

PATENT

Attorney Docket No. 83707

Applicant or Patentee: Gus Alexander, Mark Ansari, and Goki Onay
Serial Or Patent No.: 09/033,332
Filed or Issued: March 2, 1998
For: HIGH-PRESSURE HOSE AND PRESSURE WASHER

**VERIFIED STATEMENT (DECLARATION)
CLAIMING SMALL ENTITY STATUS
37 C.F.R. §§ 1.9(f) & 1.27(c) - SMALL BUSINESS CONCERN**

I hereby declare that I am:

- ☐ the owner of the small business concern identified below:
☒ an official of the small business concern empowered to act on behalf of the concern identified below:

Name of Concern: FAIP North America, Inc.
Address of Concern: 125 East Commerce Drive
Schaumburg, Illinois 60173

I hereby declare that the above-identified small business concern qualifies as a small business concern as defined in 13 C.F.R. § 121.3-18, and reproduced in 37 C.F.R. § 1.9(d), for purposes of paying reduced fees under Sections 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement: (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time, or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either directly or indirectly one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention entitled: HIGH-PRESSURE HOSE AND PRESSURE WASHER, by inventor(s) Gus Alexander, Mark Ansari, and Goki Onay, as described in:

- ☐ The specification filed herewith.
☒ Application Serial No. 09/033,332, filed March 2, 1998.
☐ Patent No. , issued .

Others Having Rights In The Invention

If the rights held by the above-identified small business concern are not exclusive, each individual, concern, or organization having rights in the invention is listed below and no rights to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 C.F.R. § 1.9(c) if that person made the invention, or by any concern which would not qualify as a small business concern under 37 C.F.R. § 1.9(d), or

a nonprofit organization under 37 C.F.R. § 1.9(e). (NOTE: Separate verified statements are required from each named person, concern, or organization having rights to the invention averring to his/her/its status as a small entity.)

Name:

Address:

☐ Individual

☒ Small Business Concern

☐ Nonprofit Organization

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate (37 C.F.R. § 1.28(b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

Name of Person Signing: Mr. Gus Alexander

Title in Organization: President

Address of Person Signing: 1535 Freeman Road
Hoffman Estates, Illinois 60195

Signature

Date

S P E C I F I C A T I O N

TO ALL WHOM IT MAY CONCERN:

Be it known that Gus Alexander and Mark Ansari, citizens the United States, and residents at Hoffman Estates, Illinois, and Schaumburg, Illinois, respectively; and Goki Onay, a citizen of Germany and resident of Crystal Lake, Illinois, have invented a certain new and useful HIGH-PRESSURE HOSE AND PRESSURE WASHER of which the following is a specification.

HIGH-PRESSURE HOSE AND PRESSURE WASHER**FIELD OF THE INVENTION**

5 The invention is in the field of pressure washing equipment, and relates specifically to hoses for high-pressure pressure washers.

BACKGROUND OF THE INVENTION

10 The prior art has provided pressure washers for use in washing surfaces such as wood, tile, concrete and the like. A pressure washer typically comprises a source of a pressurized washing fluid that fluidically communicates with an operator wand via a high-pressure hose. The prior
15 art further has provided numerous hoses for use in conjunction with such pressure washers, which hoses typically comprise a jacketed core of thermoplastic material or other material. Such conventional pressure washer hoses are capable of accommodating the moderately
20 high pressures associated with conventional power washers while leaving a satisfactory margin of safety. Consumer applications mandate a margin of safety of 300%, and thus, for example, a hose having a nominal rating of 1000 psi will require, at a minimum, that the hose be able to
25 accommodate a pressure of at least about 4000 psi as measured, for example, in accordance with SAE J17. The prior art has provided a number of pressure washer hoses that have such a nominal rating with a 300% safety margin.

Hoses designed for use in consumer applications must
30 be sufficiently flexible to accommodate the demands of consumer pressure washers. The prior art has not provided a satisfactory flexible thermoplastic pressure-washer hose that is designed to operate at pressures greater than about 2000 psi, with the 300% safety margin conventionally
35 required. Thus, such hoses are unsuitable for higher pressure applications, wherein the pressure generated by the pressure washer exceeds about 2000 psi. The

limitations of known pressure washer hoses thus impose this practical pressure limit on consumer pressure washers with highly non-kinking flexible hoses.

The prior art has further provided numerous high-
5 pressure hoses for use in applications other than pressure washers, such as industrial fire protection hoses and chemically resistant hoses for industrial equipment. Typically, such a hose comprises an inner tube covered with a reinforcing braided sheath, which, in turn, is covered by
10 an outer jacket. Known consumer grade high-pressure hoses typically are made of very stiff materials to accommodate the high pressures expected under operating conditions, and little or no thought typically is paid to the flexibility of the hose. As a result, such hoses generally are
15 unsuitable for use with consumer pressure washer applications, which mandate that the hose be highly flexible. Moreover, many such hoses tend to kink if bent past an angle of about 90° over a short distance, which kinking is disruptive of the flow of pressurized fluid
20 through the hose and potentially detrimental to the hose and to the equipment serviced by the hose.

The prior art has further taught the use of corrugated hoses in an effort to increase the flexibility of the hose. Such corrugated hoses, however, are expensive to
25 manufacture, and are thus not well suited for use with consumer pressure washers.

In light of the foregoing problems in the art, there exists a need for a flexible inexpensive pressure-washer hose that will accommodate higher pressures than
30 conventionally attainable with known pressure washer hoses while maintaining the margin of safety required for consumer pressure washers.

OBJECTS AND SUMMARY OF THE INVENTION

35 It is a general object of the invention to provide a high-pressure thermoplastic hose capable of attaining an operating pressure of at least about 2000 psi, and

preferably up to about 3000 psi, while remaining sufficiently flexible for use with consumer pressure washing applications.

Another object of the invention is to provide a pressure washer having a flexible hose that can accommodate operating pressures of at least about 2000 psi while maintaining the 300% safety margin desired for consumer applications.

Another general object of the invention is to provide a flexible high-pressure hose that can be manufactured inexpensively.

The foregoing general objects are achieved by the present invention, which provides a flexible high-pressure pressure-washer hose that can accommodate pressures of at least about 8000 psi, thus allowing a pressure washer to have an operating pressure of at least 2000 psi while leaving a 300% safety margin. The hose includes a flexible inner core, a flexible intermediate reinforcing sheath covering the core, and a jacket covering the flexible sheath. In accordance with the invention, the hose is provided with an inner core and sheath that each are sufficiently flexible such that the hose has a minimum bend radius at ambient pressure no greater than about 38 mm, while being capable of accommodating pressures of at least about 8000 psi.

Other objects and advantages of the invention will become apparent upon reading the following detailed description and upon reference to the drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a diagrammatic depiction of an illustrative pressure washer having a flexible high-pressure hose in accordance with the invention.

FIG. 2 is an enlarged side elevational view, partially cut away, of the high-pressure hose of the pressure washer shown in Fig. 1.

FIG. 3 is an enlarged cross-section taken in the plane of line 3-3 in Fig. 2.

FIG. 4 is a plan view of the hose shown in Fig. 2 when the hose is bent through an angle of 180°.

5 While the invention is susceptible of various modifications and alternative constructions, certain illustrated embodiments thereof has been shown in the drawings and will be described below in detail. It should be understood, however, that there is no intention to limit the invention to the specific forms disclosed, but on the contrary, the intention is to cover all modifications, alternative constructions and equivalents falling within the spirit and scope of the invention.

15 DETAILED DESCRIPTION OF THE INVENTION

Referring now to Fig. 1, the pressure washer of the invention, shown generally at 10, is of generally conventional configuration and comprises a pump 11 fluidically connected to an operator wand 12 via a high-pressure fluid transfer hose 14. The fluid used in the pressure-washer typically is water, optionally mixed with a washing fluid such as a liquid soap. Fluid is fed from the pump 11, which typically is connected to a water line for generation of a continuous stream of pressurized water. Upon leaving the pump 11, the pressurized cleaning fluid travels through the hose 14 to the operator wand 12. The operator wand 12 typically includes a nozzle 15 and trigger valve 13 for allowing an operator to controllably direct a stream of the pressurized fluid towards a substrate for washing. The hose, wand, and fluid source each may be provided with conventional fittings and couplings to effect appropriate fluid-tight connections therebetween. The hose 14, as depicted in Fig. 2, in this instance is of concentric laminar construction, and includes a central core 15, a reinforcing sheath 16, and an outer jacket 17.

In accordance with the invention, the core 15 is composed of a flexible material, which is preferably a polymeric material and which is capable of accommodating cleaning fluid of pressures of at least about 8000 psi while maintaining a high degree of flexibility when fluid is not in the hose. Materials suitable for use in conjunction with the core are numerous, and include, for example, high tensile strength thermoplastic elastomers such as those of the SANTOPRENE® family of thermoplastic rubbers. The SANTOPRENE® elastomers having a tensile strength of at least about 14 MPa and a tear strength of at least about 40 kN/m at 25°C.

The invention is not limited to the foregoing thermoplastic elastomers, and indeed any material having suitable flexibility and strength can be used in conjunction with the invention. For example, other materials suitable for use in formulating the core include rigid polymers, such as polyvinylchloride and copolymer of polyvinylchloride with other suitable polymers, which rigid polymers are conventionally employed in less flexible high-pressure hoses. To render such materials sufficiently flexible for use in conjunction with pressure-washing applications, the rigid polymer is blended with a plasticizer in an amount effective to impart sufficient flexibility to the rigid polymer such that the finished hose has the flexibility desired. When formulating a core material, the rigid polymer is preferably present in the core material in an amount ranging from about 40% to about 60% by weight, and the plasticizer is preferably present in an amount ranging from about 20% to about 40% by weight. The core may include other materials, such as stabilizers, modifiers, and other ingredients as would be within the ordinary skill in the art.

When the core is constructed of materials such as polyvinylchloride or strong thermoplastic elastomers, it will be capable of accommodating hot pressurized aqueous washing fluids, and most preferably water. For pressure

washer applications, the hose generally need not be able to accommodate oil-based fluids. In preferred embodiments of the invention, the hose will be able to accommodate washing fluids with temperatures of at least about 100° F, more preferably, at least about 120° F, and most preferably at least about 140° F.

The core preferably has an annular cross section that defines a fluid-carrying conduit within the core, the core having sufficient dimensions to accommodate the high-pressure washing fluid. In preferred embodiments of the invention, the inner radius 20 of the annular core, as shown in Fig. 3, ranges from about 3.2 to about 3.3 mm, and the outer radius 21 ranges from about 4.7 to about 4.8 mm. While the hose may be provided with a corrugated core (not shown), the core preferably is non-corrugated, and thus has a substantially uniform annular cross section.

With further reference to Figs. 2 and 3, to increase the burst resistance of the hose, the hose is provided with a flexible reinforcing sheath 16, which covers and preferably is adhesively secured to the core 15. The sheath preferably is of a braided construction, and thus preferably comprises interwoven strands of a reinforcing fibrous material. Suitable braiding materials include polyester filament yarns, most preferably high-tenacity polyester filament yarns having a tenacity of from about 800 to about 900 mN/tex and a breaking strength ranging from about 85 N to about 100 N. One suitable braiding material is a high-tenacity polyester filament yarn sold under the trademark DIOLEN 183.

Generally speaking, the braided sheath and the manner in which the braided sheath is applied over the core are conventional. Many conventional hoses are reinforced with a braided sheath that has a braid angle of about 1.40 or less. To minimize bulk and material and maintain maximum flexibility of the reinforcing layer, the braided sheath of the hose of the invention preferably is braided at an angle of at least about 1.41, more preferably a braid angle

5 ranging from about 1.41 to about 1.48. Surprisingly, it
has been found that braiding the sheath at such higher
braid angles than are conventionally employed will lend a
higher burst strength to the hose, and yet will maintain
sufficient hose flexibility to allow for use in consumer
pressure washing applications. The sheathing preferably
has a thickness ranging from about 1.0 to about 1.3 mm on a
round yarn. If desired, the hose may be provided with a
double sheathing layer, although such may detract from the
flexibility of the hose.

10 The braided sheath is preferably adhesively secured to
the core layer with a compatible adhesive, which preferably
comprises a urethane or acrylate adhesive. One suitable
adhesive comprises a mixture of polyurethane and methyl
ethyl ketone. The adhesive may be included in any amount
sufficient to impart adhesion between the core and sheath,
preferably an adhesive strength sufficient to prevent
separation of the core from the sheath when the hose is
bent.

15 To prevent damage to the braided layer and to render
the hose resistant to abrasion during use, the hose is
provided with a jacket layer 17 made of an abrasion-
resistant flexible material. The jacket material may be
similar or dissimilar to the core material, and thus, for
example, the jacket layer may comprise a SANTOPRENE® rubber
or a plasticized rigid polymer as described more fully
hereinabove. The jacket preferably has a thickness of
about 1.0 to about 1.2 mm. The jacket preferably is
adhesively secured to the braided sheath with sufficient
adhesive to impart adhesion between the jacket and the
sheath, preferably sufficient to provide an adhesive
strength sufficient to prevent separation between the
jacket and sheath when the hose is bent. The adhesive is
preferably similar or identical to that used to adhesively
connect the sheath and core.

20 In accordance with a further feature of the invention,
the hose has a minimum bend radius no greater than about 38

mm. The minimum bend radius may be determined by bending the hose with no fluid contained therein over an angle of 180° and by reducing the size of the bend to as small a diameter as possible without kinking the hose, as shown, for example, in Fig. 4. The minimum bend radius 25 of the hose 14 may be defined as the distance between the central bend line 26 of the bent portion of the hose and the center of the hose, the distance being measured along an angle normal to the bend line 26. Surprisingly, by incorporating a flexible material in the core of the hose of the present invention, a high-pressure hose having a minimum bend radius no greater than about 38 mm while maintaining the ability to accommodate high pressures may be provided. In preferred embodiments, the invention provides a hose that has a minimum bend radius no greater than about 36 mm. More preferably, the minimum bend radius is no greater than about 34 mm, and even more preferably, the minimum bend radius is no greater than about 32 mm. The high-pressure hose of the invention will thus be sufficiently flexible for use in consumer pressure washing applications.

For use in consumer applications, the hose will be provided with a hose rating sufficiently below the burst pressure of the hose to leave a 300% margin of safety between the rated pressure and the burst pressure. The burst pressure of the hose is the gauge pressure that the hose will accommodate before bursting. Thus, for example, a hose with a hose rating of 2000 psi will have a burst pressure of at least about 8000 psi, it being understood that the hose will accommodate pressures of at least 8000 psi, and possibly higher pressures, before bursting. Preferably, the hose of the invention has a burst pressure of at least about 8000 psi. More preferably, the hose has a burst pressure of at least about 9000 psi, even more preferably, the burst pressure is at least about 10,400 psi, and most preferably the burst pressure is at least about 12,000 psi.

To ensure the structural integrity of the hose, the hose should have a minimum impulse value of at least about 10,000 cycles, more preferably, at least about 20,000 cycles, and most preferably, at least about 30,000 cycles.

5 The impulse value is conventionally defined and refers to the number of cycles for which the hose may be pressurized to its hose rating (i.e., 25% of the burst pressure) and reduced to zero gauge pressure before failure of the hose, each pressurization and depressurization constituting one
10 cycle. The impulse test and equipment for conducting the impulse test are well known in the art.

Most preferably, the hose of the invention is substantially non-deforming, such that the dimensions of the hose do not change when the pressure washer is operated
15 at its rated pressure (i.e., 25% of the burst pressure). In preferred embodiments, the hose of the invention preferably has an elongation at its rated pressure of no more than about 5%, and preferably no more than about 3%. Most preferably, the volumetric expansion of the hose at
20 the rated pressure preferably is no more than about 4.0 cc/ft., more preferably, no more than about 3.8 cc/ft., and most preferably, no more than about 3.5 cc/ft.

The following examples are provided to illustrate the present invention, and should not be construed as limiting
25 in scope.

Example 1

A high-pressure hose is provided. The hose comprises a core composed of polyvinylchloride and a plasticizer in an amount effective to impart flexibility to the
30 polyvinylchloride. The core layer further includes a sulfate-based coprecipitate stabilizer, such as an INTERSTAB stabilizer in an amount sufficient to stabilize the core material. The core may include any suitable rigid polymer, such as EVIPOL polymers and SPVC polymers. If
35 desired, a modifier such as CHEMIGUM may be included in an amount suitable to impart a modified property to the core, for example, an amount of from about 5% to about 15% by

weight. Other suitable ingredients, such as calcium carbonate, may be employed if desired.

The plasticized polyvinylchloride is extruded through an annular die to form a thermoplastic hose having an inner diameter of about 6.4 mm and an outer diameter ranging from about 12 to about 13 mm. Over the extruded core is braided a high-tenacity polyester filament yarn. The yarn is braided with a braid angle of 1.41 over a layer of adhesive disposed on the core to provide an adhesive bond between the inner core and braided sheath. An outer jacket is applied over the sheath.

The hose thus formed has a burst pressure of minimum 8000 psi, and thus has a hose rating of 2000 psi. The minimum impulse value of the hose is greater than 30,000 cycles. The elongation at the hose rated pressure is 3% and the volumetric expansion at the rated pressure is about 3.5 ± 0.5 cc/ft. The hose can accommodate pressurized cleaning fluids at temperatures of up to 140° F.

Example 2

A high-pressure hose is provided in accordance with the teachings of Example 1, except that the inner core and jacket layer each comprise a SANTOPRENE® thermoplastic rubber. The hose thus formed has a minimum burst strength of 12,000 psi, a minimum impulse value greater than 30,000 cycles, an elongation at rated pressure (3000 psi) of 3%, and a volumetric expansion of about 3.5 ± 5 cc/ft at the rated pressure.

All pressures stated herein are gauge pressures.

CLAIMS:

1. A thermoplastic high-pressure hose comprising:
an inner core comprising a flexible material and
defining a fluid-carrying conduit; a flexible reinforcing
sheath covering said core; and a jacket covering said
sheath, said hose having a minimum bend radius no greater
than about 38 mm at ambient pressure and a burst pressure
of at least about 8000 psi.
2. A high-pressure hose according to claim 1, said
hose having a burst pressure of at least about 9000 psi.
3. A high-pressure hose according to claim 1, said
hose having a burst pressure of at least about 10,400 psi.
4. A high-pressure hose according to claim 1, said
hose having a burst pressure of at least about 12,000 psi.
5. A high-pressure hose according to claim 1, said
hose having a volumetric expansion of no more than about
4.0 cc/ft. at a pressure of 25% of said burst pressure.
6. A high-pressure hose according to claim 1, said
hose having an elongation of no more than about 3% at a
pressure of 25% of said minimum burst pressure.
7. A high-pressure hose according to claim 1, said
sheath being a braided sheath comprising braided polyester
strands having a braid angle of at least about 1.41.
8. A high-pressure hose according to claim 1,
wherein said hose has a minimum impulse value of at least
about 30,000 cycles.
9. A high-pressure hose according to claim 1,
wherein said core layer comprises a rigid polymer and a

plasticizer present in an amount sufficient to impart flexibility to said rigid polymer.

10. A high-pressure hose according to claim 9, wherein said rigid polymer comprises PVC.

11. A pressure-washing apparatus comprising: a source of pressurized water; an operator wand; and a hose fluidically connecting said operating wand to said source, said hose comprising an inner core comprising a flexible material and defining a fluid-carrying conduit; a flexible reinforcing sheath covering said core; and a jacket covering said sheath, said hose having a minimum bend radius no greater than about 38 mm at ambient pressure, and a burst pressure of at least about 8000 psi.

12. A pressure-washing apparatus according to claim 11, said hose having a burst pressure of at least about 9000 psi.

13. A pressure-washing apparatus according to claim 11, said hose having a burst pressure of at least about 10,400 psi.

14. A pressure-washing apparatus according to claim 11, said hose having a burst pressure of at least about 12,000 psi.

15. A pressure-washing apparatus according to claim 11, said hose having a volumetric expansion of no more than about 4.0 cc/ft. at a pressure of 25% of said minimum burst pressure.

16. A pressure-washing apparatus according to claim 11, said hose having an elongation of no more than about 3% at a pressure of 25% of said minimum burst pressure.

17. A pressure-washing apparatus according to claim 11, said sheath being a braided sheath comprising braided polyester strands having a braid angle of at least about 1.41.

18. A pressure-washing apparatus according to claim 11, wherein said hose has a minimum impulse value of at least about 30,000 cycles.

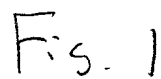
19. A pressure-washing apparatus according to claim 11, wherein said core layer comprises a rigid polymer and a plasticizer present in an amount sufficient to impart flexibility to said rigid polymer.

20. A pressure-washing apparatus according to claim 19, wherein said rigid polymer comprises PVC.

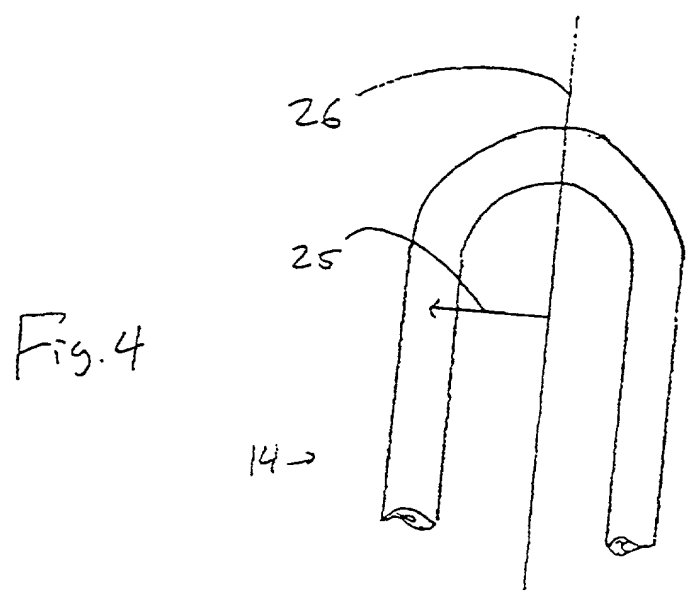
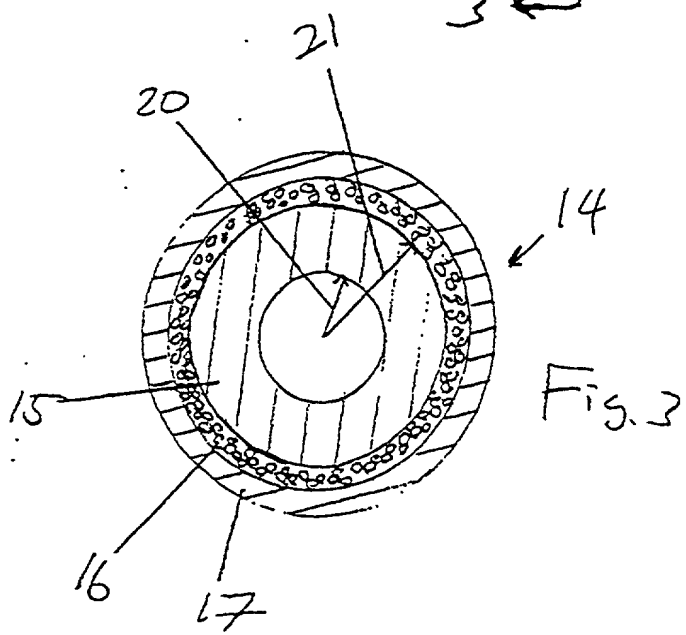
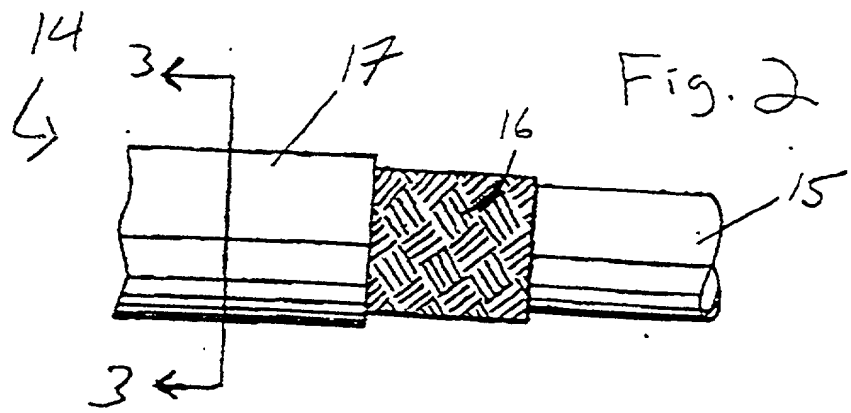
ABSTRACT OF THE DISCLOSURE

A flexible pressure-washer hose and pressure washing apparatus are disclosed. The hose is of concentric laminar construction and comprises an inner core, an intermediate sheath covering the core, and a jacket covering the intermediate sheath. The disclosed hose has a burst pressure of at least 8000 psi, yet is highly flexible, such that the hose has a minimum bend radius of no more than about 38 mm. The disclosed pressure washer comprises a hose made in accordance with the invention and fluidically connecting a source of pressurized fluid to an operator wand.

SECRET



2025 RELEASE UNDER E.O. 14176





PATENT
Attorney's Docket No. 83707

COMBINED DECLARATION AND POWER OF ATTORNEY

As below named inventor, I hereby declare that

This declaration is of the following type:

- ☒ original ☐ design ☐ supplemental
☐ national stage of PCT
☐ divisional ☐ continuation ☐ continuation-in-part

My residence, post office address, and citizenship are as stated below next to my name. I believe I am the original, first, and sole inventor (*if only one name is listed below*) or an original, first, and joint inventor (*if plural names are listed below*) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

HIGH-PRESSURE HOSE AND PRESSURE WASHER

the specification of which:

- ☒ is attached hereto.
☐ was filed on _____ as Serial No. _____ and was amended on _____ (*if applicable*).
☐ was filed by Express Mail No. _____ as Serial No. *not known yet*, and was amended on _____ (*if applicable*).
☐ was described and claimed in PCT International Application No. _____ filed on _____ and as amended under PCT Article 19 on _____ (*if any*).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claim(s), as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

COUNTRY	APPLICATION	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 USC 119			
				YES		NO
				YES		NO
				YES		NO
				YES		NO

I hereby claim the benefit pursuant to Title 35, United States Code, § 119(e) of the following United States provisional application(s):

PRIOR U.S. PROVISIONAL APPLICATIONS CLAIMING THE BENEFIT UNDER 35 USC 119(e)	
APPLICATION NO.	DATE OF FILING

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56 which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application.

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 USC 120					
U.S. APPLICATIONS			Status (check one)		
U.S. APPLICATIONS	U.S. FILING DATE		PATENTED	PENDING	ABANDONED
1. 0 /					
2. 0 /					
3. 0 /					
PCT APPLICATIONS DESIGNATING THE U.S.			Status (check one)		
PCT APPLICATION No.	PCT FILING DATE	U.S. SERIAL NOS. ASSIGNED (if any)	PATENTED	PENDING	ABANDONED
4.					
5.					
6.					

DETAILS OF FOREIGN APPLICATIONS FROM WHICH PRIORITY CLAIMED UNDER 35 USC 119 FOR ABOVE LISTED U.S./PCT APPLICATIONS				
ABOVE APPLN. NO.	COUNTRY	APPLICATION NO.	DATE OF FILING (day,month,yr)	DATE OF ISSUE (day,month,yr)
1.				
2.				
3.				
4.				
5.				
6.				

As a named inventor, I hereby appoint the following attorneys to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

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I hereby declare that all statements made herein of my own knowledge are true, that all statements made on information and belief are believed to be true, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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